Objective

To describe the amount and distribution of water in the earth's oceans, rivers, lakes, groundwater, ice caps, and atmosphere.

Background

The earth is also known as the "water planet," as approximately 70 percent of its surface is water. Water is found in rivers, ponds, lakes, oceans, ice caps, clouds, and as groundwater. All these forms of water are part of a dynamic and interrelated flow called the hydrologic cycle, in which each part of the cycle shares a portion of the total amount of water on the planet.

Many people think water is a limitless resource, yet simple calculations demonstrate the fact that the amount of water on our planet is in fact limited. It is known that the earth has the same amount of water now as it did when it was first created, therefore, the amount of water available to humans and wildlife depends largely on how its quality is maintained. Every person has the responsibility to conserve water, use it wisely, and protect its quality.

Materials

- Large map of the world or 12" diameter globe
- Five-gallon container (aquarium or bucket)
- Three clear containers
- Tablespoon
- Eye dropper
- Calculator, pencil and paper (for older students)

Activity Steps

- 1. Using the map/globe, begin a discussion about how much water is present on earth. Encourage the students to discuss where water is located on earth (oceans, rivers, atmosphere, groundwater, ice caps). Ask students to comment on why the earth is also known as the "water planet," calling attention to the statistic that approximately 70% of the earth's surface is covered with water.
- 2. Discuss the difference between fresh water and salt water. Ask the students which is drinkable by humans.
- 3. For groups of *younger students skip to step 4*. For *older students*, discuss the following percentages:

Oceans 97.24% All ice caps/glaciers 2.14% Groundwater 0.61% Freshwater lakes 0.009% Inland seas/salt lakes 0.008% Soil Moisture 0.005% Atmosphere 0.001% All	All Water on Earth	
Groundwater 0.61% Freshwater lakes 0.009% Inland seas/salt lakes 0.008% Soil Moisture 0.005% Atmosphere 0.001%	Oceans	97.24%
Freshwater lakes 0.009% Inland seas/salt lakes 0.008% Soil Moisture 0.005% Atmosphere 0.001%	All ice caps/glaciers	2.14%
Inland seas/salt lakes 0.008% Soil Moisture 0.005% Atmosphere 0.001%	Groundwater	0.61%
Soil Moisture 0.005% Atmosphere 0.001%	Freshwater lakes	0.009%
Atmosphere0.001%	Inland seas/salt lakes	0.008%
	Soil Moisture	0.005%
All	Atmosphere	0.001%
	All	

Key topics

Earth science, hydrologic cycle, measurements, calculations

Grade level

Adaptable for all ages

Duration

15-35 minutes



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rivers_	0.0001%
Total	100%

Ask *older students* to calculate the estimated amount of fresh water on the earth and write the calculations on a piece of paper. Explain to students that the estimated calculation is the amount of water potentially available for human use:

Useable Freshwater on Earth		
Groundwater	0.61%	
Freshwater lakes	0.009%	
Rivers	0.0001%	
Total	0.6191%	
Adding ice caps/glaciers	2.14%	
Total	2.7591%	

4. Show students the five gallon container and tell them that the five gallons of water represent all the water on earth. The container has water from the ocean, water from the ground, water from lakes and streams, water from the atmosphere, and water from the glacial ice caps..

Older students can calculate the volume of salt water and freshwater by using the tables above. Tell the students that 5 gallons of water contains 1,280 tablespoons and that all decimal places must be shifted two places to the left prior to multiplication (for example, 97.2% becomes 0.972), therefore 0.972 x 1280 tablespoons = 1244.16 tablespoons.

5 Gallons		
Oceans	1244.67	
Ice caps/glaciers	27.39	
Groundwater	7.81	
Freshwater lakes	0.12	
Inland seas/salt lakes	0.10	
Soil Moisture	0.06	
Atmosphere	0.01	
Rivers	0.001	
Total approx. 1280 tablespoons		

Older students can then calculate the volume of water found in sources other than the ocean--the answer is approximately 35 tablespoons.

- 5. Ask a volunteer to remove 35 tablespoons of water from the container of five gallons, put the 35 tablespoons into an empty container. The water in the five gallon container represents all the salty water contained in the oceans. The 35 tablespoons represent all other forms of water on earth. For *younger students*, it is helpful to label these containers "ocean or salt water" and "freshwater."
- 6. Now ask a volunteer to remove the amount of water represented by all freshwater lakes from the freshwater container. They will measure out 0.12 tablespoons (approximately one-tenth of a tablespoon or 12 drops from an eye dropper)--have *older students* calculate this amount.

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Put this water into a new container and label it "lakes and rivers."

- 7. Now remove the amount of water from the "freshwater" container which represented by groundwater, or seven tablespoons. Pour this water into a third empty contain and label "groundwater."
- 8. Discuss the relative proportions with students, considering the fragile nature of the wetlands, oceans, and freshwater of earth. Discuss how all species depend upon this small percentage of water for their survival. Summarize the activity by using a globe to illustrate that if the earth were this size (12 inches in diameter), less than one-half cup (eight tablespoons) of water would fill all the oceans, rivers, lakes, and ice caps. Emphasize the importance of keeping the earth's water clean and healthy by using it wisely and responsibly.

Activity Source

How Wet is Our Planet was adapted from "Making Discoveries," published by The Groundwater Foundation. If you are interested in more activities based on environmental issues, see our online catalog or contact The Groundwater Foundation at **1-800-858-4844**.